NOTES ON NEOTROPICAL TABANIDAE (DIPTERA) XIV. TWO NEW SPECIES OF TABANUS FROM PANAMA AND COLOMBIA[1]

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ABSTRACT—A group of 6 coastal swamp inhabiting species of *Tabanus* (Dipt. Tabanidae) from Panama and Colombia is reviewed. All species are keyed and figured, and *T.* **nondescriptus** and *T.* **eldridgei** n. sp. are described.

The accumulation of much additional material from Pacific coastal areas of eastern Panama, due to the efforts of personnel of the Office of Interoceanic Canal Studies during 1967, clarified the interrelationships of a group of tidal swamp-inhabiting species. Four of these were previously described (Fairchild, 1943), and later (Fairchild, 1958) additional material of 3 of them was reported and variation discussed. With adequate material it now appears that at least 6 species form a closely similar group sharing the same general habitat, and ranging from Panama to Ecuador, though only in Panama has this habitat been at all explored for Tabanids. It is the purpose of this note to provide a key to the species, descriptions of the 2 new species, and figures and comparative notes on all species. The "frontal index" referred to in the key is obtained by dividing the length of the frons from a line joining the inner eye angles to the vertex, by the width at the base between the inner eye angles. The head should be positioned so that both base and vertex are in the same focal plane when measuring length of frons.

Key to Females

1. Wings greyish hyaline, including costal cell, without brown clouds or darkened vein margins. Frontal index 3 or less 2
— Wings with at least narrow brown margins on veins, costal cell sometimes darkened. Frontal index 3 or more 3
2. Frontal index about 2.3. Median callus absent. Mesonotum unstriped, it and scutellum dark steel grey, abdomen yellowish brown with 3 narrow indistinct pale-haired stripes. Eyes uniformly green in life .... *rhizophorae* Fairchild
— Frontal index about 3. Median callus usually present as a slender, sunken groove. Mesonotum striped, brownish grey, scutellum concolorous. Abdomen cinnamon brown with an obscure median row of small grey triangles and more prominent dorsolateral steplike broad grey stripes. Eyes bronzy with a narrow median dark stripe .... *praepilatus* Fairchild
3. Abdomen when undenuded with definite pale-haired dorsolateral stripes as well as a median stripe. Frontal index usually less than 4 4

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— Abdomen when undenuded without dorsolateral stripes, yellow basally, contrasting with blackish mesonotum. Frontal index usually greater than 4, 5

4. Palpi very slender, almost clubbed at tip. Frontal callus drop-shaped. Basal plate of antenna only slightly longer than wide. Smaller species, wing length 8–10 mm. Eyes green with median stripe and lower margin dark purplish .... *nereus* Fairchild

— Palpi stouter, tapered. Frontal callus oblong or long oval. Basal plate markedly longer than wide. Larger species, wing length 9–12 mm. Eyes bronzy, unpatterned .... *nondescriptus* Fairchild, n. sp.

5. Frontal index about 4. Frontal callus drop-shaped. Basal plate of antennae less than twice as long as wide, the third segment about ½ height of frons. Abdomen with conspicuous broad pale middorsal stripe. Eye bronzy green, unstriped. Costal cell hyaline .... *rixator* Fairchild

— Frontal index about 5. Frontal callus oblong or long oval. Basal plate unusually slender, over twice as long as wide, the third segment over ½ height of frons. Abdomen with inconspicuous narrow middorsal pale stripe. Eye green with dark median stripe and lower margin. Costal cell dark yellow .... *eldridgei* Fairchild, n. sp.

Tabanus rhizophorae Fairchild

fig. 1

Tabanus rhizophorae Fairchild 1942, Ann. Ent. Soc. Amer. 35:449–450, fig. 6. ♀. Old Panama, R. de P.

The types consisted of 11 ♀ and 2 ♂, all collected sweeping marsh grass, or netted in the vicinity of tidal mud flats near Old Panama and Paitilla Point, on the outskirts of Panama City. Since then only a few specimens have been secured, as follows: 1 ♀, Old Panama, 10 May 1949, sweeping salt marsh grass; 1 ♀, San Francisco de la Caleta, between Old Panama and Paitilla Point, biting on beach, 6 February 1955; 1 ♀, Chame Bay, Panama Prov., netted near tidal flats, 15 April 1955; 1 ♀, Venado Beach, Ft. Kobbe, Canal Zone, 28 April 1959, W. J. Hanson coll. All localities are on the Pacific coast of Panama. A single ♀ specimen, El Maria, Coiba Island, Panama, 16 January 1950, P. Galindo coll. differs in having a tinted costal cell and slightly narrower frons, but lacks antennae. The locality is a large island off the coast of Chiriqui Prov., and this specimen may represent a distinct form. The male differs from males of *nondescriptus* and *praepilatus*, the only other species of this group whose males are known, in having the upper eye facets poorly differentiated and demarcated.

Tabanus praepilatus Fairchild

fig. 2

Tabanus praepilatus Fairchild 1943, Ann. Entomol. Soc. Amer. (1942) 35:445–446, Fig. 11, ♀. 1947, Ann. Entomol. Soc. Amer. (1946), 39:569. 1958, Ann. Entomol. Soc. Amer., 51:530, ♂.

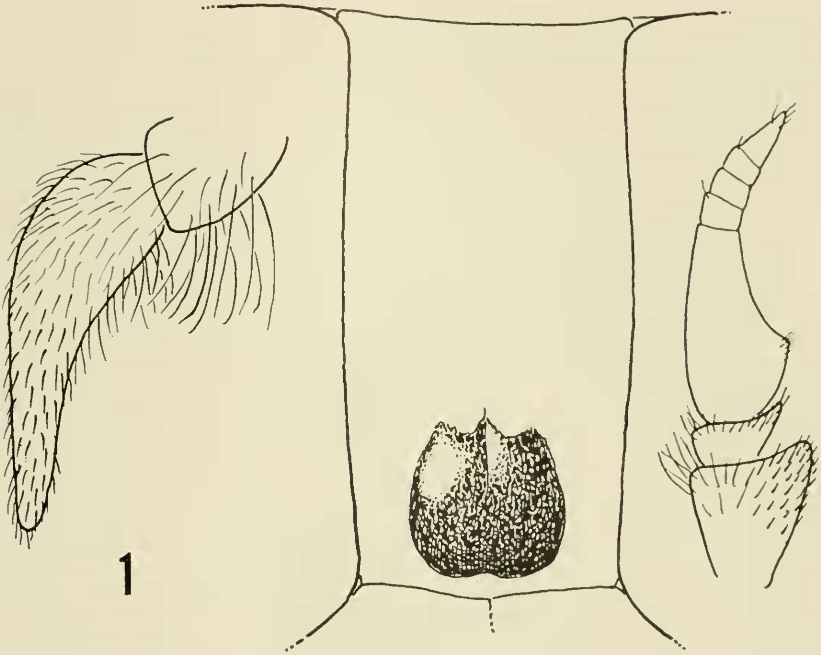

Fig. 1. *Tabanus rhizophorae* San Francisco de la Caleta, Panama, 6 Feb. 1955, biting on beach. All figures are to the same scale and all are of females.

The species occurs in or near coastal mangrove swamps on the Pacific coast of Panama from Guarachiné, Darien Prov. to Guararé and Tonosí, Los Santos Prov. Specimens have been taken from January to June and August, so it may fly throughout the year. The single ♂ was taken in a light trap at Guarachiné, together with 2 ♀. The eye in life is greenish bronze with a single narrow median dark stripe.

Tabanus rixator Fairchild

fig. 5

Tabanus rixator Fairchild 1943, Ann. Entomol. Soc. Amer., (1942) 35:448, Fig. 10, ♀. 1958, Ann. Entomol. Soc. Amer., 51:530 (in part).

The types are not now before me, and it is quite possible that specimens of *nondescriptus* formed part of the type series, as is intimated in the second reference above. At any rate, most of the specimens listed in 1958 seem to belong to *nondescriptus*, and I now have but 2 specimens of true *rixator*, one of which was compared with the holotype. This specimen is from Paitilla Point, Panama City, 13 September 1950. The other is also from vic. Panama City, taken in

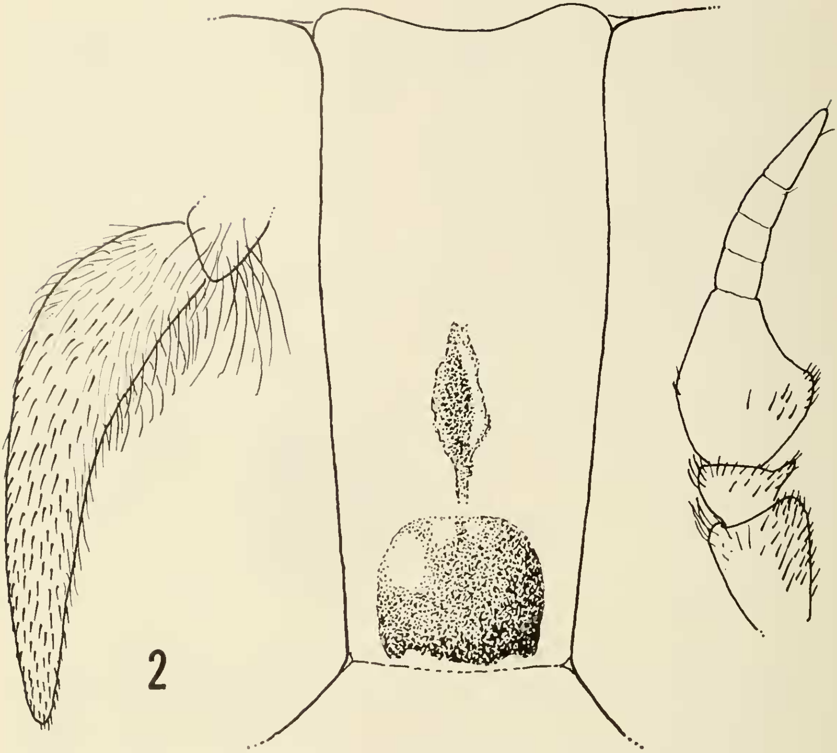

Fig. 2. *Tabanus praepilatus* Los Santos, Salinas, Panama, 13 Feb. 1964, Henriquez coll.

a mangrove swamp at the base of Paitilla Point, 3 December 1964. These localities are now entirely urbanized. Both specimens had bronzy green eyes without bands.

Tabanus nereus Fairchild

fig. 3

Tabanus nereus Fairchild 1943, Ann. Entomol. Soc. Amer., (1942) 35:446, fig. 9, ♀. 1958, Ann. Entomol. Soc. Amer., 51:530.

In addition to the specimens previously reported, I have now seen the following material. 12 ♀, Howard Field, Ft. Kobbe, C. Z., May, June, July, August, October, and December taken in horse-baited mosquito stable traps and 1 in a light trap; 25 ♀, Curiche River, Choco, Colombia, May, June, July, August, October, and November 1967, collected mostly in Malaise traps by personnel of the Office of Interoceanic Canal Studies. A somewhat defective specimen from

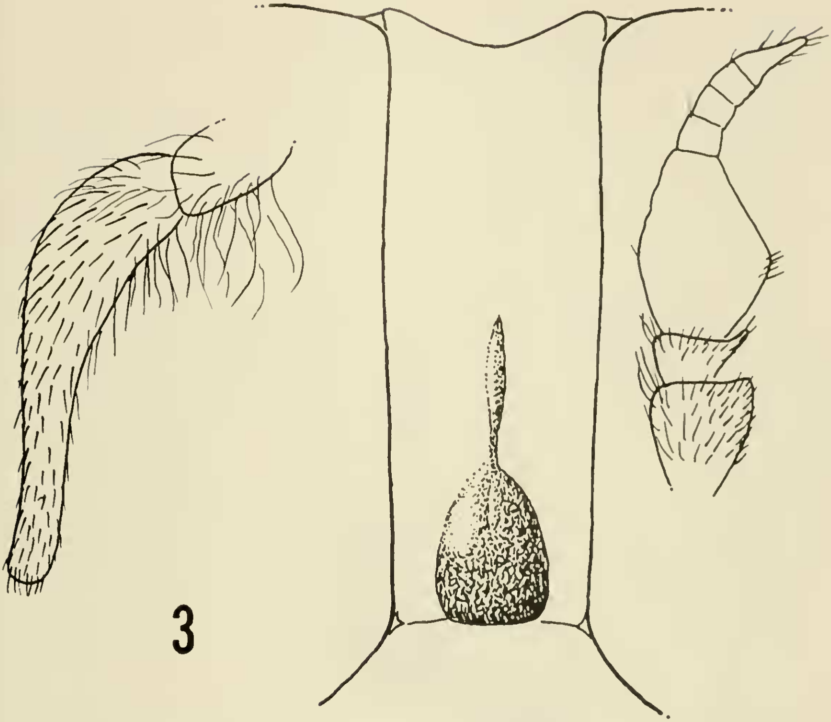

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Fig. 3. *Tabanus nereus* Old Panama, Panama, light trap 26 Sept. 1952.

Guayaquil, Ecuador, May–June 1913 is probably also *nereus*. The accumulated data thus indicate that this species occurs along the Pacific coast from Los Santos Prov., Panama to Guayaquil, Ecuador, and flies almost entirely during the rainy season.

Tabanus nondescriptus Fairchild, new species

fig. 4

Tabanus rixator, Fairchild, 1958, Ann. Entomol. Soc. Amer., 51:530, in part, nec Fairchild, 1943.

A small dull brownish species with 3 inconspicuous pale stripes on abdomen, wings with all veins narrowly brown margined, frontal callus brown, higher than wide, and eyes unpatterned.

Female. Length 13.5 mm, wings 12 mm. Eyes bare, bronzy green in life, without bands. Frons slightly over 4 times as high as basal width, about ⅓ wider at vertex than at base, pale brownish-grey pollinose with scattered short black hairs. Basal frontal callus yellowish brown, higher than wide, long oval or oblong, narrower than frons, usually separated from a small spindle-shaped median callus. Subcallus concolorous with frons, pollinose, without hairs. Frontoclypeus and

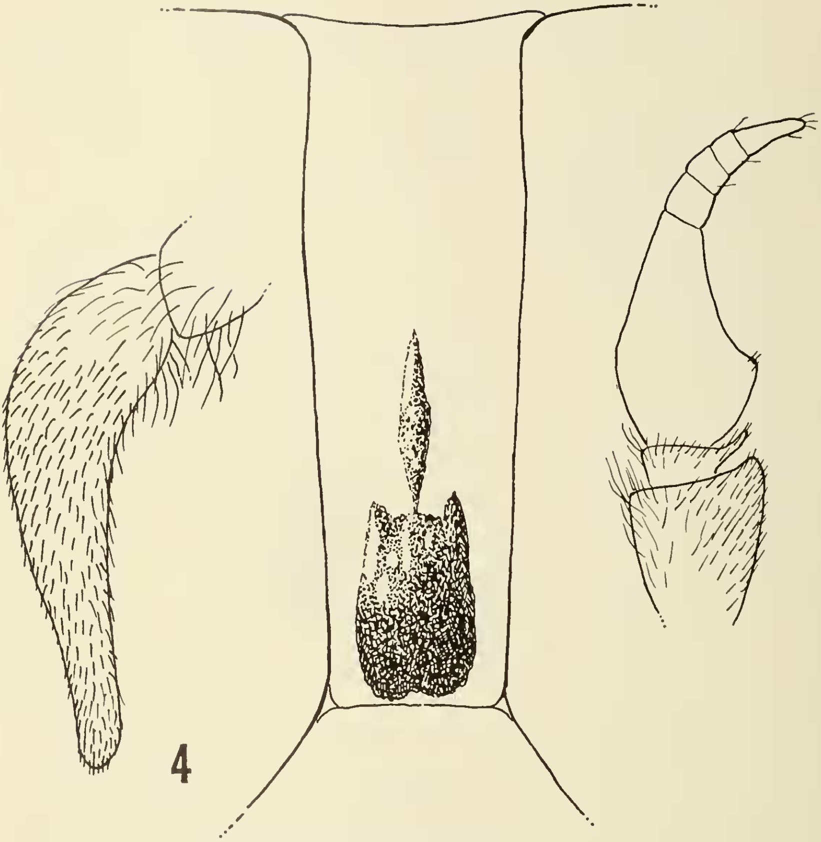

Fig. 4. *Tabanus nondescriptus* n. sp. Holotype.

genae paler and greyer, sparsely white-haired except area adjoining subcallus which is brown-haired. Beard white. Antennae wholly orange, the scape slightly narrower than width of basal plate, beset above with black hairs. Pedicel short, with moderate dorsal spur, black-haired. Basal plate longer than wide, longer than style, its dorsal angle prominent, at about ⅓ distance from base to apex of plate. Palpi white, the first and base of second white-haired, remainder black-haired, second segment slightly inflated basally, rather slender but blunt-pointed, subequal to antennae in length. Proboscis reddish brown, labella fleshy, sclerotized parts not much longer than palpi.

Mesonotum reddish brown, grey pollinose, beset with sparse short black and golden hairs, forming indistinct stripes. Notopleural lobes concolorous, with longer black hairs. Scutellum paler, more reddish, with sparse long black hairs dorsally, shorter pale hairs on sides. Pleura paler, white pollinose and white-haired.

Legs light reddish to yellowish brown, the femora and coxae white-haired, the tibiae mostly yellow-haired, but with black hairs apically on fore and hind pairs.

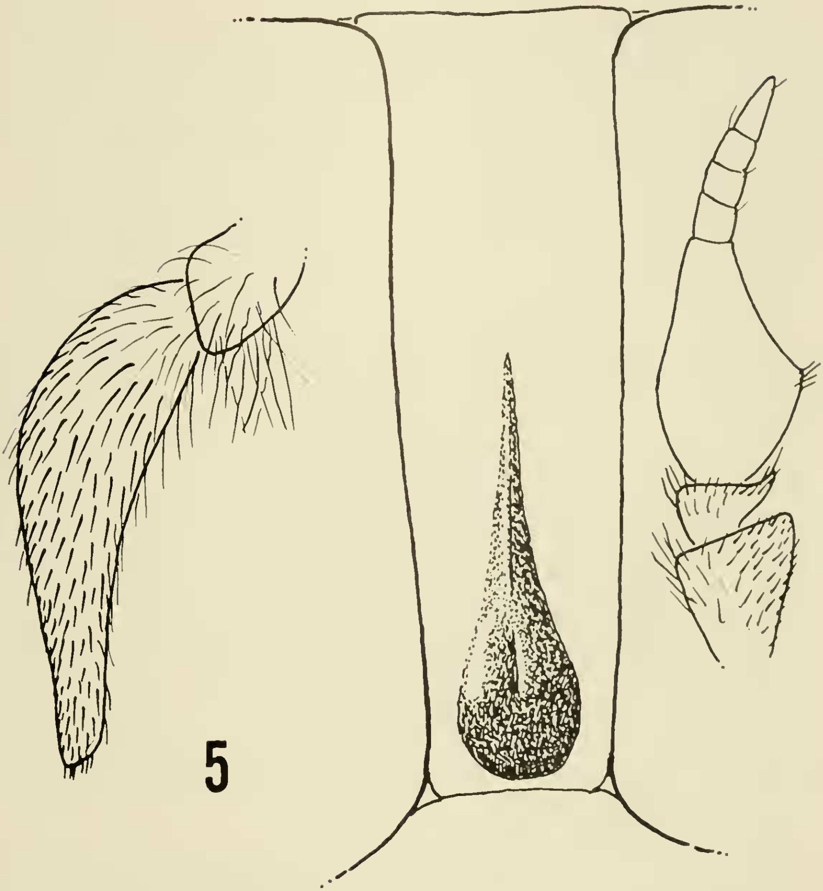

Fig. 5. *Tabanus rixator* Homotype. Paitilla Point, Panama, 13 Sept. 1950.

Tarsi slightly darker, black-haired dorsally, copper-haired ventrally. Wings with venation normal, short spur at sharp angle of fork of third vein, glass clear except for faint and very narrow browning along all veins. Stigma yellow. Halters pale yellow.

Abdomen dull light reddish brown, thinly greyish brown pollinose, dorsally clothed with short black hairs, except for middorsal series of narrow, contiguous, whitish or pale yellow-haired triangles on terga 1 to 6, and pair of dorsolateral pale-haired stripes on terga 2 to 5. Middorsal stripe underlaid by paler pollinosity, dorsolateral stripes less so. Tergum 7 wholly dark-haired. Sterna and extreme sides of terga white-haired.

Holotype ♀, vic. Old Panama, Panama prov., Republic of Panama, 10 June 1949, netted in mangrove swamp.

Male. Length 10 mm, wing 9 mm. Eyes holoptic, bare, larger facets well-differentiated and demarcated, forming patch in upper ½ of eye occupying about ½ total eye area, with border of small facets to vertex. Line between large and small facets not abrupt, size change occurring over several rows of facets, those in the center much the largest. Small flattened tubercle sunk between eyes at vertex. Antennae as in female, though third segment more slender. Palpi porrect, white haired, last segment oval, not mammillate.

Coloration as in female, abdomen with sparser, longer hairs in which pale hairs appear to predominate, though the specimen is not well enough preserved to discern a pattern.

Allotype ♂, Chame, Panama prov., Panama, 3 April 1951, light trap.

Paratypes: 6 ♀, same data as holotype, (some labelled IV–10–49, others VI–10–49, the April date probably the correct one): 1 ♂ 1 ♀, Chame, Panama prov., 3 April 1951, light trap; 1 ♀, Panama, R. Paessler, July–Aug. 1907; 1 ♀, vic. Panama City, 3 Dec. 1964, in mangrove swamp; 1 ♀, Libano, Panama prov., 27 Aug. 1963, Shannon trap; 2 ♀, Juan Diaz, Panama prov., 16 Dec. 1964, mangrove swamp; 2 ♀, Tocumen, Panama prov., 30 Nov. 1964; 2 ♀, San Jose Id., Pearl Islands, 23 March 1946, D. Jenkins coll.; 1 ♀, same locality, July 1944, Morrison coll.; 6 ♀, Patiño Point, Darien prov., 18 July, 17 Aug. 1952, light trap; 68 ♀, Santa Fé, Darien prov., Nov. 1966(2), Jan. 1967(1), Feb. 1967(12), Mark 1967(23), Apr. 1967(16), May 1967(8), July 1967(1), Sept. 1967(1), Oct. 1967(2), no date (2), mostly collected in Malaise trap, O.I.C.S. coll.; 8 ♀, Ft. Kobbe, Canal Zone, Jan., Feb., Apr., 1953, Oct. 1957, May, July 1968, and no date, in horse baited mosquito trap. 1 ♀, Camarón, Panama, nr. Ft. Kobbe, Dec. 1951, horse trap. 1 ♀, Albrook Field, C. Z., Aug. 1951. Types in my coll. pro tem.

The paratypes range in wing length from 9 to 12 mm, and there is a short stub at the fork of the third vein in about ½ the wings, the remainder usually having an angle at the point where an appendix would be. Fresh specimens are slightly darker than the holotype, which was selected because it shows especially well the abdominal pattern.

The species is exceedingly close to *nereus* Fairchild, but differs in having unbanded eyes, a higher, more rectangular callus, differently shaped antennae, more prominently striped abdomen and larger average size. The means and medians for wing lengths of available specimens of *nereus* are both 9.5 mm, and for *nondescriptus* 11.13 and 11.25 mm, for those from Sta. Fé, Darien, and 11.0 mm and 10.5 mm for those from all other localities. *Tabanus nondescriptus* differs from *rixator* in generally larger size, reddish scutellum, long oval or oblong callus, and in lacking a broad prominent yellow stripe on abdomen.

The species occurs near or in mangrove swamps along the Pacific coast from Darien Prov. to the Canal Zone area. Specimens have been taken flying about the collector, in horse-baited mosquito stable traps, and most abundantly, in Malaise traps. It appears to fly throughout the year, with perhaps a peak of abundance from February through May.

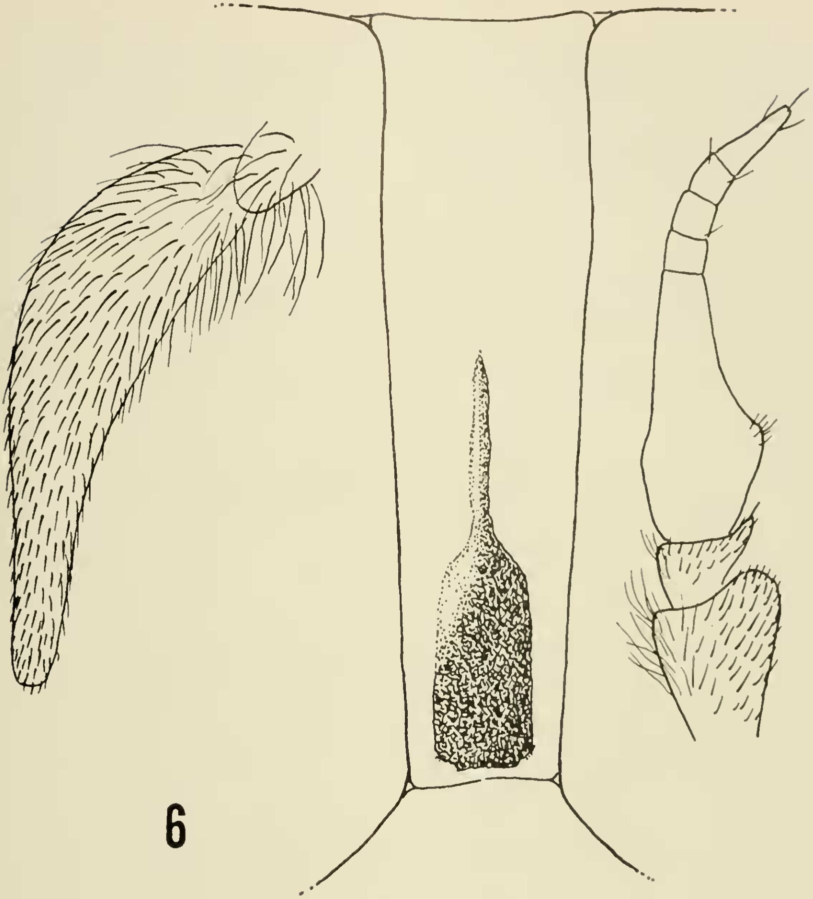

Fig. 6. *Tabanus eldridgei* n. sp. Holotype.

Tabanus eldridgei Fairchild, new species
fig. 6

Female. Length 13.5 mm, wing 12.5 mm. Eyes bare, in life green with single purple band above middle and lower margin broadly purple. Frons about 5 times as high as width at base, narrowed below, as figured, orange brown pollinose and with scattered erect dark hairs. Vertex with slightly paler, greyish discolored spot. Frontal callus narrower than frons, higher than wide, as figured, yellowish brown. Subcallus pollinose, slightly paler than frons. Frontoclypeus and genae yellowish grey pollinose, beard grey. Antennae as figured, orange yellow, first 2 segments beset with black hairs, third slightly darker, style dusky but not contrasting strongly with basal plate. Palpi moderately slender, as figured, yellowish white, beset with black hairs throughout.

Mesonotum and scutellum blackish brown, unstriped, notopleural lobes very slightly paler, thinly brown pollinose and thinly beset with mixed erect black hairs and semi-recumbent shiny golden hairs. Pleura steel grey, whitish pollinose and greyish-white-haired. Coxae pinkish grey, pale-haired. Femora yellowish brown, mainly black-haired, fore pair slightly darker. Fore tibiae obscurely bicolored, basal third yellowish brown, apical ⅔ blackish, all black-haired. Mid and hind tibiae concolorous with femora, black-haired, hind pair without conspicuous fringe. Tarsi dusky, but only fore pair black. Wings with normal venation, no appendix at fork of third vein. Costal cell deep yellow, stigma brown and all veins broadly and heavily brown margined, especially towards wing apex, wing otherwise dusky hyaline. Halters dull yellow.

Abdomen above with first 3 terga brownish yellow, remainder blackish, subshiny, clothed with black hairs except for narrow paler pollinose middorsal stripe from segments 1 to 6, which is beset with sparse orange hairs on terga 1 to 3. Posterior border of tergum 1 also bears orange hairs in the middle. Beneath the abdomen is yellowish on first 3 sterna, blackish on remainder, pale pollinose, pale haired on first 3 segments, becoming darker posteriorly, not noticeably banded.

Holotype ♀, Curiche River, Choco Dept., Colombia, 5 June 1967, I.O.C.S. No. 1401. In U.S. National Museum. Named in honor of Lt. Col. Bruce F. Eldridge, under whose able direction this and many other biting arthropods were collected during a biomedical survey of possible sea level canal routes through eastern Panama and adjacent Colombia.

Paratypes 38 ♀, same locality, April (4), May (10), June (7), July (2), Aug. (1), Sept. (1), Oct. (7), Nov. (4), Dec. (1), 1967. These paratypes range in wing length from 10 to 12.5 mm. 2 ♀, Rio Raposo, Dept. Valle, Colombia 14 Oct. and 18 Nov. 1965, V. H. Lee coll.; 1 ♀, Esmeraldas, Prov. Esmeraldas, Ecuador, no date, Luis A. Leon coll. These last 3 are the size of the smallest Choco specimens. Paratypes in U.S.N.M., M.C.Z. and my collection.

This species is closely related to *T. nondescriptus* Fairchild, *rixator* Fairchild, and *nereus* Fairchild. From the first it differs in having a yellow costal cell and more heavily dark-margined wing veins, more slender third antennal segment, narrower and more convergent frons, in lacking any vestiges of dorsolateral abdominal pale stripes, and in having banded eyes. From *rixator* it differs in more heavily marked wings and yellow costal cell, narrow mid-abdominal stripe, narrower frons, more slender antennae, banded eyes and generally larger size. From *nereus* it differs in narrower frons, taller callus, longer and more slender antennae, yellow costal cell, no dorsolateral stripes, and blackish scutellum.

An additional 5 ♀, 3 from Curiche River and 2 from Rio Raposo, are very similar, but have the costal cell not tinted, the veins less heavily margined, frons broader and callus wider, fore tibiae bicolored and mesonotum and scutellum blacker, with greyer pollinosity. I believe they are a different species, but since none is perfect and the specimens few, I refrain from describing them at this time.

References

Fairchild, G. B. 1943. Notes on Tabanidae (Dipt.) from Panama. X. The genus *Tabanus* Linn., and resume of the Tabanidae of Panama. Ann. Entomol. Soc. Amer. 35:441–474. (1942)

————. 1958. Notes on Neotropical Tabanidae. II. Descriptions of new species and new records for Panama. Ann. Entomol. Soc. Amer. 51:517–530.

FOUR NEW SPECIES OF ONTHOPHAGUS FROM MEXICO AND THE UNITED STATES (COLEOPTERA; SCARABAEIDAE)

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ABSTRACT—Four new species of Mexican and United States *Onthophagus* Latreille are described: **cartwrighti** from Southern California and Baja California, **cuevensis** from Tamaulipas and San Luis Potosi, and **neomirabilis** and **subcancer** from Oaxaca.

In 1932 Boucomont published a paper entitled, "Synopsis des *Onthophagus* d'Amerique du Sud." The title is misleading, since the paper is an extensive review of the genus for the New World from Mexico southward. Common species north of Mexico were included, but obviously no careful study was made of the Canadian and United States species. This was rectified with the publication by Howden and Cartwright of the "Scarab beetles of the genus *Onthophagus* Latreille north of Mexico" (1963). Scattered descriptions of Central and South American species have appeared since 1932, but no one has radically altered the groupings established by Boucomont.

The present paper describes 1 species from Southern California and Baja California, not included in Howden and Cartwright's 1963 revision, and 3 from Mexico. None of the 3 Mexican species falls readily into groups established by Boucomont, and none is closely related to described North or Central American species.

Photographs used herein, except for figs. 8 and 12, were taken using a JEOL-U3 scanning electron microscope. Specimens were not coated or treated, specimen charging being largely eliminated by the use of low voltages (1.8 to 2.0 KV).

Onthophagus cartwrighti Howden, new species

fig. 3, 4, 5

Holotype: Male, major, length 7.0 mm, greatest width 3.8 mm. Very similar to *velutinus* Horn (see Howden and Cartwright, 1963, p. 105), differing from male majors of *velutinus* as follows: clypeus more reflexed anteriorly, most discal punctures discrete, posterior margin with distinct carina; frons coarsely punctate,